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COMPLETE SPECIFICATION.

A Process for the Manufacture of Non-Alcoholic Beer.

I, VALENTIN LAPP, of Leipzig-Lindenau, Germany, Brewer, do hereby declare the nature of this invention and in what manner the same is to be performed to be particularly described and ascertained in and by the following statement:—

The process for the manufacture of non-alcoholic beer which is the object of  
5 this invention consists in further treating the mash, which has been boiled, clarified, and cooled to 45° R. in the usual manner, with diastase, so that a minimum proportion of dextrin and a maximum proportion of maltose is formed, and in again boiling the wort after this treatment and then bringing it into intimate contact with oxygen by centrifuging and atomising it while it is hot, so that sub-  
10 stances which would subsequently cause it to become turbid and would unfavourably influence its taste and keeping properties, may be separated from the beer.

For a complete separation of these substances and a consequent improvement in taste, the beer is afterwards again atomised while hot, this time in an atmosphere of carbon dioxide, and then quickly and very intensely cooled, whereupon it  
15 is filtered and again treated and saturated with carbon dioxide.

In addition to these main operations there is in the process a number of subsidiary operations which are described in the detailed portion of the Specification. The whole process is as follows:—

The malt is crushed and mashed, and the mash is gradually heated to 60° R.  
20 The mash is allowed to remain at this temperature until the saccharification appears to have set in, and then the mash is boiled, whereby a further dissolution of starch occurs. The wort thus obtained is clarified and the clear wort which still contains starch, is further saccharified by diastase, which has been previously prepared, and is then treated at 45° R., so that as little dextrin as possible, but,  
25 on the other hand much maltose is formed, while the dextrin and other constituents contained in the saccharified wort are changed into easily digestible substances. The wort which is now completely saccharified is again brought to the boiling point and pure lupulin especially obtained from hops is added, after which the wort is boiled for 15 minutes.

30 The boiling hot wort is now run into a centrifugal machine and centrifuged in this hot condition so that it is atomised whereby it comes into such intimate contact with the atmospheric oxygen that a considerable separation occurs, especially of albumin and similar products which if they were left in the beer would subsequently, by their gradual separation, render it turbid and make its  
35 taste unpleasant.

The wort, which has been converted into a mass of foam by the powerful centrifuging to which it has been subjected, is then passed into a large vat in which it gradually settles. The dirty covering of foam is removed and the remaining wort is filtered through a filter press, being still maintained in a hot condition for  
40 this purpose.

The clear, filtered, hot wort is next treated with carbon dioxide, in an appropriate apparatus, in such a manner, that it again becomes a mass of foam. This

[Price 8d.]



*Lapp's Process for the Manufacture of Non-Alcoholic Beer*

treatment of the hot wort with carbon dioxide especially effects a great improvement, for those substances which the first centrifuging in the air did not separate from the wort, but should be separated, are now separated by the action of the carbon dioxide. Furthermore, by this treatment of the beer it acquires a fresh, new and agreeable taste.

The wort which has been thus treated is now immediately and as quickly as possible cooled to 0°, or to  $\frac{1}{2}$ ° below 0°, so that it begins to freeze on the surface. By this extremely rapid cooling the wort is further improved, for all those substances will be precipitated and will settle which otherwise must be separated by a lengthy fermentation process. The cooling is effected by running the wort, or rather beer, into tinned copper vats in which large cooling coils are placed; through these a cooling liquid at a temperature of from -15° R. to -20° R. flows. There is thus a comparatively very large difference between the temperature of the beer to be cooled and that of the cooling liquid, so that the desired very rapid cooling is attained.

As soon as the beer has been cooled to 0° R., it is submitted to the fining filtration at the same temperature, and then passed into a carbonating apparatus, in which, still at a temperature of 0° R., it is saturated with carbon dioxide. The beer is then bottled or run into casks. In the latter case an isobarometric apparatus is used. If the beer is to be sent a long distance in bottles or casks and must therefore have an appropriate degree of keeping quality, it is finally sterilised in the water bath, but for home consumption a final sterilisation is not necessary.

The beer manufactured by the foregoing process is absolutely free from alcohol and germs, of excellent taste, of great digestibility and has already all the properties which are usually associated with good cellar beer.

Having now particularly described and ascertained the nature of this invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A process for the manufacture of non-alcoholic beer consisting in treating the mash, after the first boiling and clarification, with diastase so that a minimum proportion of dextrin and a maximum proportion of maltose are formed, substantially as described.

2. In combination with the process for the treatment of wort referred to in Claim 1, the method of again boiling the wort treated as above and then centrifuging and atomising it while hot so as to bring it into intimate contact with oxygen for the purpose of separating constituents which might afterwards render the beer turbid or impair the flavour thereof substantially as described.

3. In combination with the process for the treatment of wort or beer referred to in Claims 1 and 2 the method of again atomising the hot wort or beer, this time in an atmosphere of carbon dioxide, for the purpose of separating further detrimental constituents, substantially as described.

4. In combination with the process for the treatment of wort or beer referred to in Claims 1 to 3 the method of quickly and intensely cooling the beer so as to remove the remainder of the detrimental substances therefrom, substantially as described.

5. In combination with the process for the treatment of beer referred to in Claims 1 to 4 the method of further treating or saturating the pure beer free from alcohol so obtained, with carbon dioxide, substantially as described.

Dated this 21st day of December 1897.

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